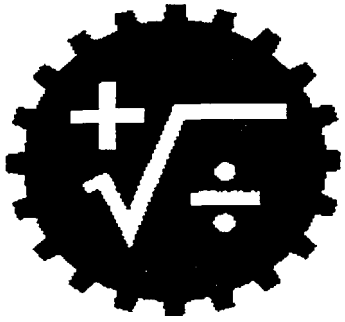
Assessment Annotations
for the Curriculum Frameworks

Mathematics

Grades 4, 8, and 10



Missouri Department of Elementary and Secondary Education
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MATHEMATICS- ASSESSMENT ANNOTATIONS

For The

Mathematics Curriculum Frameworks

The attached document provides supplemental assessment information to *Missouri's Framework for Curriculum Development in Mathematics* K-12. Contained within this assessment supplement are annotations that should be useful in understanding state and local responsibilities in assessing curriculum at the fourth, eighth, and tenth grade levels. This document indicates appropriate content and process specifications that should be useful in establishing curricula that prepares students to be proficient in mathematics.

Since the fourth and eighth grade benchmarks were established by the Framework's design, the column labeled, "What Students Should Know," establishes content that is appropriate for state testing. In addition, at the fourth, and eighth grade, the column labeled "What Students Should Be Able To Do" indicates appropriate processes for assessment. The last column labeled "Assessment Notes" further clarifies whether these processes are best assessed at the state or local level. If the phrase " Grade (4 or 8) state assessment" is shown-then this indicates that this process may be tested on the state mathematics examination at the indicated grade level.

Because benchmarks were not explicitly indicated at the tenth grade, the assessment notes provide information for both the "To Know" and "To Do" columns. The assessment notes indicate whether the content and processes are appropriate for assessment at the tenth grade on the state examination. Under the " Know" and "Do" categories in the assessment notes column, if the notation "Grade 10 state assessment" is indicated then this identifies content and processes that may be assessed at the state level. Under the " Do" of the assessment notes, process items are classified on whether these are assessed at the state level or better assessed at the local level. The notation "Beyond 10th grade state assessment" indicates material that students may or may not have covered at this point and therefore is not tested at the state level.

All of the benchmarks that were identified by the notation, "Grade (4, 8, or 10) state assessment," will not necessarily appear on a state test in any given year. The number of test items developed to access mathematical content and processes may vary from year-to-year. Only Framework pages that required assessment notes are provided within this document which results in the skipping of some page numbers.

I. Problem Solving

What All Students Should Know	What All Students Should Be Able To Do	Fourth Grade Assessment Notes
y the end of grade 4, all students should now	NOTE: Each item in this column is designed to address several elements of "what all students should be able to do." *By the end of grade 4, all students should be able to*	Do
1. A variety of problem-solving strategies (such as making a list, drawing a picture, looking for a pattern, acting out the problem).	a. work individually and with others to use problem- solving approaches to investigate and understand mathematical content (NCTM Standard 1; MO 1.6, 3.5, 3.6, 4.6)	a. Local assessment
2. Computational strategies with whole numbers (addition, subtraction, multiplication and division).	b. use problem solving strategies to construct meaning from mathematical tasks (NCTM Standard 1; MO 1.6, 3.7)	b. Grade 4 state assessment
3. When to use concrete objects, calculators, computers, charts, graphs, etc., to organize and solve problems.	c. recognize and define theoretical and actual problems encountered in everyday life, mathematical situations, and various disciplines (NCTM Standard 1; MO 3.1, 3.4)	c. Grade 4 state assessment d. Grade 4 state assessment e. Grade 4 state assessment
4. Mathematical problem-solving strategies can apply to all disciplines and real-world problems.	d. develop and apply strategies to predict, prevent, and solve a wide variety of problems (NCTM Standard 1; MO 3.2, 3.3)	f. State assessment will address use of some manipulatives—pattern blocks, money, and ruler.
	e. verify, interpret, and evaluate whether a solution addresses the original problem (NCTM Standard 1; MO 2.2, 3.6, 3.7, 3.8)	
	f. select and apply appropriate mathematical tools and technology to solve problems (NCTM Standard 1; MO 2.7)	

I. Problem Solving

What All Students Should Know	What All Students Should Be Able To Do	Eighth Grade Assessment Notes
By the end of grade 8, all students should know	NOTE: Each item in this column is designed to address several elements of "what all students should be able to do." *By the end of grade 8, all students should be able to*	
1. A variety of problem-solving strategies (such as organizing data, drawing a picture, looking for a pattern, writing an expression using a variable).	a. use problem-solving approaches to explore and construct meaning from mathematical content (NCTM Standard 1; MO 1.6, 3.4, 3.5, 3.7)	Do a. Grade 8 state assessment
2. Computational strategies with whole numbers, decimals, fractions, and integers.	b. pose authentic problems within and outside the field of mathematics (NCTM Standard 1; MO 2.1, 3.1, 3.4, 3.6)	b. Local assessment
3. Models, calculators, computers, charts, and graphs may be used to organize and solve problems.	c. develop and apply strategies to solve problems, with emphasis on multistep and non-routine problems (NCTM Standard 1; MO 1.8, 3.2, 3.3)	c. Grade 8 state assessment d. Grade 8 state assessment
4. Mathematical problem-solving strategies can apply to all disciplines and real-world problems.	d. analyze, evaluate, and verify results with respect to the original problem (NCTM Standard 1; MO 2.2, 3.7, 3.8)	e. Grade 8 state assessment
	e. transfer strategies to similar problems (NCTM Standard 1; MO 3.2, 3.3, 3.6)	

I. Problem Solving

What All Students Should Know	What All Students Should Be Able To Do	Tenth Grade Assessment Notes
By the end of grade 32, all students should know	NOTE: Each item in this column is designed to address several elements of "what all students should be able to do."	
	By the end of grade 12, all students should be able to	
1. Problem-solving strategies such as organizing data, drawing a picture, looking for a pattern, modeling, researching, and algebraic strategies.	a. use problem-solving strategies to investigate and understand mathematical content (NCTM Standard 1; MO 1.6, 3.5	Know 1 Grade 10 state assessment Do a. Grade 10 state assessment
2. Computational strategies for the set of real numbers.	b. recognize and formulate problems from situations within and outside mathematics (NCTM Standard 1; MO 3.1, 3.5)	2. Grade 10 state assessment b. Local assessment
3. Models, calculators, computers, charts, graphs, etc., may be used as problem-solving tools.	c. organize, develop and apply integrated mathematical problem-solving strategies to solve problems within and outside mathematics (NCTM Standard 1; MO 3.2, 3.3)	3. Grade 10 state assessment c. Grade 10 state assessment
4. Mathematical problem-solving strategies can apply to all disciplines and real-world problems.	d. apply the process of mathematical modeling to real-world problem situations (NCTM Standard 1; MO 2.1, 3.6)	4. Grade 10 state assessment d. Grade 10 state assessment
	e. analyze, evaluate, and reflect upon the process(es) used in solving problems (NCTM Standard 1; MO 2.2, 3.4, 3.6, 3.7, 3.8)	e. Grade 10 state assessment